

## Mussel and Oyster Farming: A Small Step in Indian Mariculture but a Giant Leap in Coastal Rural Livelihood

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The low cost user-friendly bivalve mariculture practices developed and field tested by the Central Marine Fisheries Research Institute in the estuaries and coastal regions have become an opportunity for earning livelihood as a seasonal avocation among the rural people. The coastal aquaculture in India has been centered around shrimp, finfish and crab. Shrimp, which has a broad market appeal and high demand has been the principal and most valued aquaculture product of India. After a phenomenal increase in production of farmed shrimp from 40,000 tonnes in 1991-92 to 70,686 tonnes in 1996-97, the coastal aquaculture industry faced a set back due disease outbreak and environmental and legal issues. Coinciding with this, in the south west coastal areas, the commercial-

ization of bivalve mariculture was witnessed. Since 1996, the level of adoption and production through farming has been showing exponential growth (Fig.1) in the southern maritime States and it has been estimated that in 2002, the production of farmed mussel and oyster reached 1250 and 350 tonnes respectively. Though negligible when compared with the global production of 1.1 and 3.0 million metric tonnes respectively, these figures are commendable considering the fact that farming of these resources are unconventional in the Indian context. The technologies of mussel and oyster farming have the following salient features:

- ◆ Easy to adopt and does not call for any skilled activity
- ◆ Raw materials, mainly bamboo poles, nylon /coir ropes and seed are locally available
- ◆ Bivalves are filter feeders hence supplementary feed is not required
- ◆ The crop period is short ranging between 5 to 7 months
- ◆ Farming is seasonal

and ecofriendly.

- ◆ Absence of diseases and pests.
- ◆ Good market demand.

The main beneficiaries of bivalve development programmes are women, who have willingly adopted the technologies that offer them a working environment and life style as close as possible to the traditional activities to which they are accustomed. Apart from increased food production, overall rural development and employment generation have been possible. A brief account of the bivalve mariculture activities in India is given hereunder.

### Mussel Farming

Among the maritime States, Kerala was the first to recognize the aptness of the mussel and oyster farming technologies for rural development. Following the demonstration programme of CMFRI in 1996, the Kerala government extended the financial support for mussel farming through DWCRA (Development of Women and Children in Rural Areas) as a component of the IRDP (Integrated Rural Development Programme). Consequent to this, in north Kerala the local governing bodies identified the women beneficiaries with the help of village extension officers and district administration. After the selection of beneficiaries and formation of Self Help Groups, a series of awareness camps on mussel farming were conducted by CMFRI in each Panchayat (village). Beneficiaries were given training in their own farms in all aspects from seeding to harvesting. One-day workshops were organized in different villages involving villagers, bank officials, officers of the district administration and village extension workers. The Women Self Help Groups with

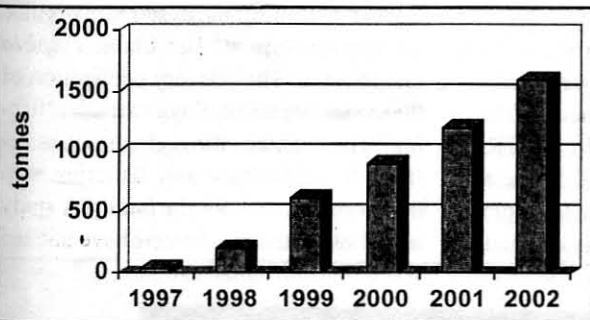


Fig 1 : Cultured marine bivalve production in India

### Women Self Help Groups and Mussel Farming \*

- ◆ Average members per group- 13
- ◆ Average amount provided for mussel farming as loan – Rs.76,800
- ◆ Nylon rope for seeding and bamboo poles for farm structures formed 34% and 20 % of the total expenditure
- ◆ Average percentage of subsidy – 47%
- ◆ Cost ( average ) per farm – Rs. 44,000
- ◆ Average production per farm of 777 mussel ropes – 25 tonnes
- ◆ Returns (Average) – Rs. 57,000
- ◆ Net operating profit ( Avg) – Rs. 12,800

\* ( All values are averages of 6 SHG's involved in mussel farming in Kerala)

11 to 15 members were given financial aid @ Rs.8800/- per member with 45 to 50 % subsidy. The loan period was 5 years with an interest of 12.5 % per annum. Apart from this, they were also provided a revolving fund of Rs 5000/- without interest. In Kerala, apart from the direct involvement in mussel farming, women also get part time employment during the harvest season.

The most significant outcome of this activity has been women empowerment. The members of the group actively take part in all the activities of mussel farming right from getting the finance to marketing the produce. The technical aspects of the farming such as farm construction, seed collection and seeding, farm maintenance and harvesting are also done as a group activity during the post monsoon season. Apart from this they keep account of the money spent and the returns and are prompt in repayment of loan availed by them. Consequent to the success of mussel farming by Women Self Help Groups in the Padanna village of Kasargod district of Kerala in 1996, the neighbouring villages also started mussel farming programmes. Now these schemes are under the SGRY (Swarnajayanthi Gramasa Rosgar Yojana). The loans are granted through Farmers Co-operative Banks and Gramin Banks.

Mussel farming has become a solace to unemployed youth in certain regions of Kerala. In Ponnani, a group of young men of the organization "Youth Power" initiated mussel culture during 2001-2002 and now in the Beeyam kayal mussel farming has become a basis of self employment to the rural youth. In certain other regions like the Vallikunnu Panchayat, it is the family which becomes the core group. Individual families or a group of two to three families join together and carry out mussel farming. Contrary to such group activities, there are individuals who have become single owners of mussel farms. Such farmers are more in the Chettuva estuary in Thrissur district. Now mussel farming is mainly carried out in 8 districts of Kerala viz. Kasargode, Kannur, Kozhikode, Malappuram, Thrissur, Ernakulam,

Alapuzha and Kollam. The State has also constituted a high level committee consisting of members from CMFRI, CIFT and Fisheries Department for formulating an action plan for accelerated development of mussel farming.

Maharashtra is the second State to propagate mussel farming as a rural development programme. Since August 2000, the CMFRI has collaborated with the Konkan Krishi Vidyapeeth (KKV), Ratnagiri in the NATP programme on Mussel Mariculture. The first phase was equipping staff of KKV and their interaction with the mussel farmers of Kerala. The second phase was the location testing at different sites near Ratnagiri through different grow out systems. Now, the technology has started reaching the coastal fishers through the effort put in by the staff of the KKV. There are women groups actively operating mussel farms in the coastal areas of Maharashtra.

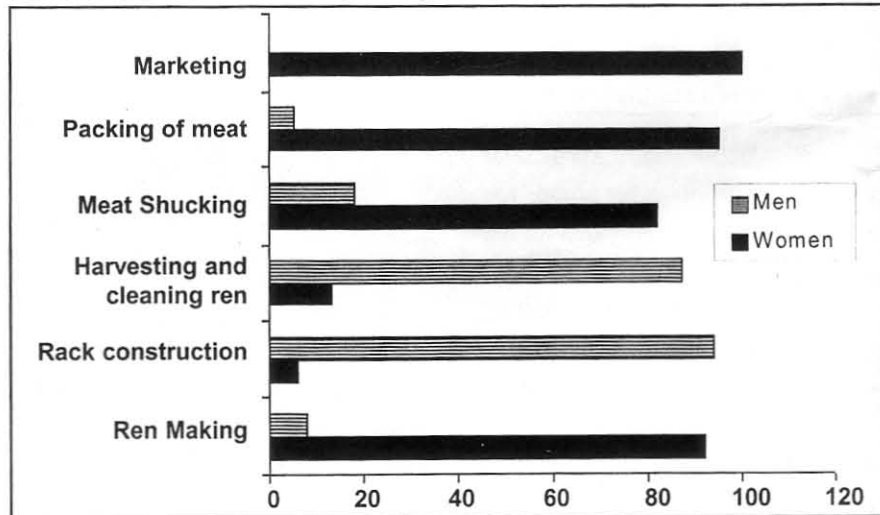
In Karnataka, mussel farming demonstration programmes conducted by the CMFRI were successful in proving the feasibility of the technique, but the level of adoption was lower than those in Kerala and Maharashtra. The farming programmes in Mulki estuary and in the open sea near Byndoor were implemented with the involvement of local fishers. Experiments done by CMFRI in Andhra Pradesh and Tamil Nadu also confirmed the viability of the technology. However due to several reasons, mainly

lack of market demand, financial assistance and concerted action plans, the practices have not been adopted yet.

### Oyster Farming

Similar to mussel farming, oyster farming has also developed as a community based programme in Kerala. Two main estuaries, the Ashtamudi and the Kayamkulam Lakes have seasonal oyster farms which are financed by the BFFDA. About Rs.1500 is provided per individual and 11 to 15 women form a Self Help Group. The entire amount is pooled and the women set up oyster farms. All the major activities of the farming are done by women and their family members including children and grand parents. In some villages, oyster farms are owned by individuals or families.

In a recent survey conducted by CMFRI, it was noted that in Ashtamudi Lake, 95% of the families involved in oyster farming earned their livelihood mainly through clam fishing. The male members collect the clams while the female members heat shuck the meat and market it. Some of the oyster farmers also do semiculture of the clam, *Paphia malabarica*. The primary occupation of the oyster farmers in Kayamkulam is fishing. The women, through activities related to agriculture and fisheries earn additional income for the family. A study also showed that the farmers have utilized



Involvement of women (as % of total) in various activities related to oyster farming in Kerala

the profit (ranging from 700 to Rs. 25,000 per head) for various family commitments. 78% of the farmers have utilized the money for repayment of loan taken for house construction, daughters' wedding, childrens' education *etc.* while 12% have purchased new items such as jewellery (a form of security investment) and to meet expenditure related to marriage, child birth, death in the family *etc.* 10% of the farmers used the money for daily household expenditure during the lean fishing season.

The technology adoption was found to be the outcome of the demonstration and training activities at the farmers' sites. Subsidies and finance given by the State government through BFFDA and local governing bodies have also played a motivating role in the development of bivalve farms.

### Present Research and Future Thrust Areas

Considering the strides made in technology adoption, the CMFRI has given thrust to research activities which are essential in developing bivalve mariculture as an industry. One of the priorities in edible bivalve culture is the selection of the site of farming. Through the NATP programme on mussel mariculture, attempts are made to classify the water bodies based on EEC guidelines. Studies on bioaccumulation and monitoring of biotoxins are carried out at the Institute, the latter through a collaborative programme with CIFT. The impact of the suspended farming of bivalve molluscs on the environment is being studied through a scheme funded by the International Foundation for Science, Sweden.

The requirement for bivalve seed has been increasing and the supply demand dynamics can lead to social issues between traditional fishers and mussel farmers. To avoid this and to support the industry, the Institute has laid emphasis for collection of mussel seed from the natural beds by setting up spat collectors. By providing additional settlement substrata, seed availability can be con-

siderably enhanced. Simultaneously, attempts are made to refine and modify the existing farming techniques. Encouraging results have been obtained and it is hoped that these refinements would lead to reducing the recurring expenditures.

### Development Plan for Bivalve Farming

Rural aquaculture is increasingly recognized as a way to improve the livelihood of poor people, and many government and development agencies attach importance to this sector in the Asian and Pacific region. The recent upsurge in bivalve technology adoption in Kerala and Maharashtra could be a role model to other maritime states also.

The following suggestions could be useful for the development of edible bivalve farming :

1. Though the capital investment is low, it is essential to provide subsidies at least during the initial years to the farmers at the appropriate time. Schemes which are available to the farmers of Kerala can be adopted in other maritime States also.
2. Bivalves have to be depurated before marketing to ensure quality of the product. Since individual farmers cannot own depuration units, it will be ideal if the States set up common facility at selected centers where farmers could depurate the produce at a nominal cost.
3. Facilities for common storage of harvested mussel also have to be developed in coastal areas where more farms are located.
4. At present the farm produce is marketed in the domestic markets mainly by the Integrated Fisheries Project (IFP) and by the farmers themselves at the farm site. Part of the farmed mussels is also exported. It is imperative that a well developed product awareness campaign and a marketing chain is developed within and outside the State.

5. Product diversification and international markets for this resource can be developed with support from CIFT and MPEDA respectively.
6. Currently there are no rules for ownership of water bodies. A system of leasing has to be developed to give support to the farmers by the maritime States.

The domestic consumer demand for mussels and oysters in India has been low till recently. Globally, developments in food science and technology, combined with improved refrigeration and the use of microwave ovens, are making convenience foods, ready meals, coated fish products and other value-added items a fast-growing industry. It is possible to develop the internal market demand for bivalves which will motivate more fishers to take up mussel and oyster farming.

Rural development schemes in a three tier *Panchayat* administration where the research institutes can support the farmers with the technology and district panchayats/ Gramin banks/ Cooperative banks/ NABARD with adequate finance to start the farm will be more effective. This system which has been very successful in Kerala can be adopted in other maritime States also. The diversification of aquaculture activities which can lead to women empowerment, additional food production and employment generation is a partial solution for coastal rural development and poverty alleviation. It is a small step in the Indian mariculture scenario, but it is a giant leap in livelihood among a few coastal rural villages in Kerala.

### Prawn Culture in Haryana : Seed and Feed Supplies from AP

It is learnt that the Haryana Fisheries Department has chosen Lokesh Feeds of Vijayawada for supply of prawn feed and BMR Hatcheries, Nellore for supply of seed under the State Government's Scheme to promote giant freshwater prawn culture on a wide scale.